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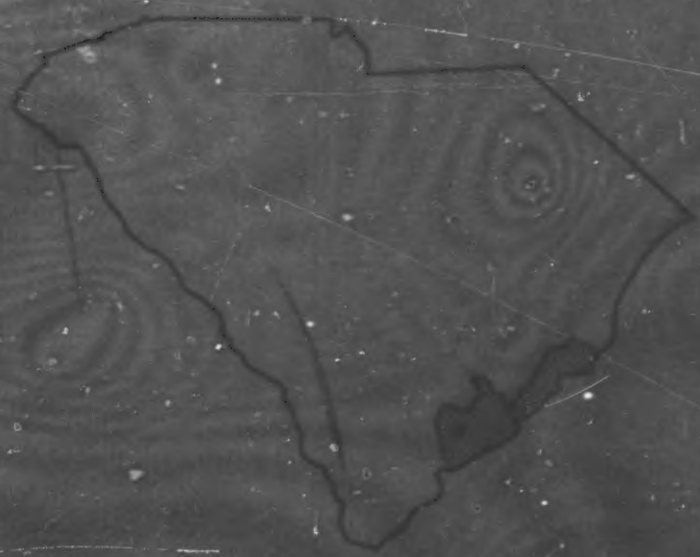
FLOOD INSURANCE STUDY

TOWN OF HOLLYWOOD, SOUTH CAROLINA

CHARLESTON COUNTY

ORIGINAL



JUNE 17, 1986

Federal Emergency Management Agency

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TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
1.1	Purpose of Study	1
1.2	Authority and Acknowledgments	1
1.3	Coordination	2
2.0	AREA STUDIED	2
2.1	Scope of Study	2
2.2	Community Description	2
2.3	Principal Flood Problems	2
2.4	Flood Protection Measures	6
3.0	ENGINEERING METHODS	6
3.1	Hydrologic Analyses	7
3.2	Hydraulic Analyses	7
4.0	FLOOD PLAIN MANAGEMENT APPLICATIONS	14
4.1	Flood Boundaries	15
5.0	INSURANCE APPLICATION	15
5.1	Reach Determinations	15
5.2	Flood Hazard Factors	15
5.3	Flood Insurance Zones	16
5.4	Flood Insurance Rate Map Description	16

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TABLE OF CONTENTS (Continued)

		Page
6.0	OTHER STUDIES	18
7.0	LOCATION OF DATA	18
8.0	REFERENCES AND BIBLIOGRAPHY	18

FIGURES

Figure	1	-	Vicinity Map	3
Figure	2	-	Transect Location Map	13
Figure	3	-	Transect Schematic	14

TABLES

Table	1	-	Parameter Values for Surge Elevations	8
Table	2	-	Summary of Stillwater Elevations	11
Table	3	-	Transect Locations, Stillwater Starting Elevations, and Initial Wave Crest Elevations	14
Table	4	-	Coastal Flood Insurance Zone Data	17

EXHIBIT

Flood Insurance Rate Map

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FLOOD INSURANCE STUDY

TOWN OF HOLLYWOOD,
CHARLESTON COUNTY,
SOUTH CAROLINA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Town of Hollywood, Charleston County, South Carolina, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

This Flood Insurance Study was prepared by compiling existing hydrologic and hydraulic technical and scientific data prepared by the Federal Emergency Management Agency (FEMA) for purposes of the National Flood Insurance Program. The data were identified as the best available at the time of compilation of this Flood Insurance Study and should depict the general conditions of the flooding sources with relative accuracy. FEMA performed a cursory review and accepted the data as valid for purposes of this Flood Insurance Study and the National Flood Insurance Program. However, if better information is known to exist or has been developed since the date of this report, the information should be immediately forwarded to the Natural and Technological Hazards Division, FEMA, Atlanta, Georgia, for consideration for revision of this study.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were obtained from the Type 19 Flood Insurance Study for the Unincorporated Areas of Charleston County, South Carolina (Reference 1).

Flood hazard areas not affected by the Type 19 reanalysis in Charleston County were taken from the Type 15 Flood Insurance Study for the Unincorporated Areas of Charleston County, South Carolina (Reference 2).

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1.3 Coordination

On December 4, 1985, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the community and FEMA.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated areas of the Town of Hollywood, Charleston County, South Carolina. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected based upon the extent and validity of available existing hydrologic and hydraulic data. A detailed coastal flooding analysis was performed on the complete coastline of the Atlantic Ocean where flooding propogates inland to affect the Town of Hollywood.

2.2 Community Description

The Town of Hollywood is located in the southwestern part of Charleston County in southeastern South Carolina. It is bordered on the south by the Town of Meggett, on the north by the Town of Ravenel, and by Charleston County on the east and west. In 1980, the population of Hollywood was reported to be 729 (Reference 3).

The mean temperatures in Hollywood range from a low of 39 degrees Fahrenheit (F.) in January to a high of 89 degrees F. in July. Average annual rainfall is 49.1 inches, with summer months receiving the most precipitation. Natural vegetation consists mostly of marsh grasses, pines, cedars, and gums (Reference 4).

2.3 Principal Flood Problems

The Town of Hollywood is subject to flooding caused by hurricanes and tropical storms. Records of hurricanes that have affected the Charleston County area can be found as early as the 17th century. Major storms and hurricanes caused flooding in 1686, 1713, 1728, 1752, 1783, 1787, 1804, 1813, 1822, 1854, 1885, 1893, 1911, 1940, and 1959 (Reference 5). The highest surges occurred during the hurricanes of August 1893 and August 1940, reaching heights up to 8.9 and 8.0 feet mean sea level (msl), respectively, in Charleston County (Reference 5).

The primary factors contributing to flooding in Charleston County are its openness to Atlantic Ocean surges and the unfavorable bathymetry extending offshore. Many of the large streams near the coast have wide mouths and are bordered by extensive areas of low marsh. In addition, the terrain at the coast is generally too low to provide an effective barrier. The offshore ocean depths are shallow for great distances, thereby generating a high Atlantic Ocean surge.

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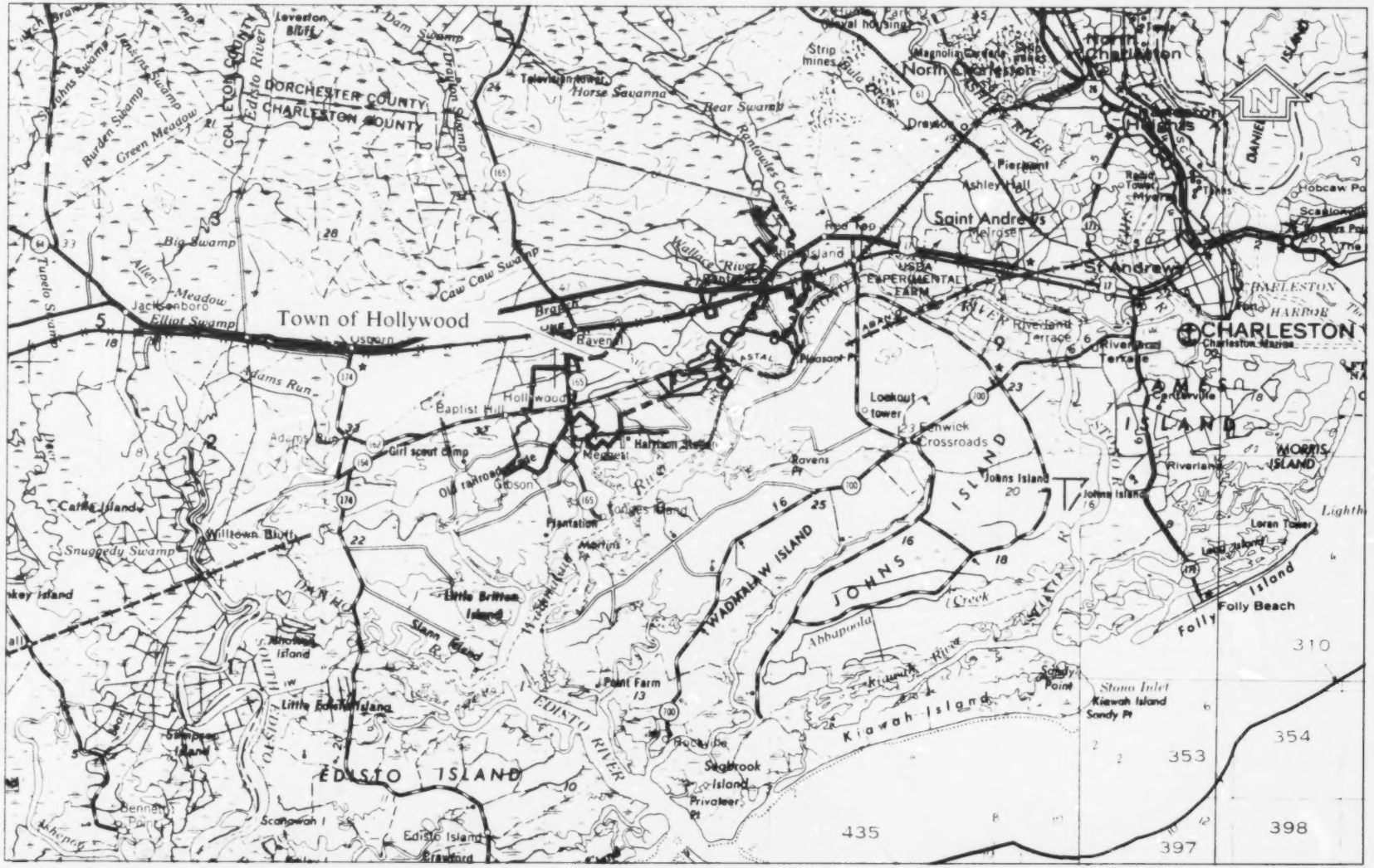

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HOLLYWOOD, SC

(CHARLESTON CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

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Although the records for the 17th and 18th centuries are limited and mostly descriptive, it is known that severe destruction and damage were caused by the 1686, 1713, 1728, 1752, 1783, and 1787 storms.

A storm history of Charleston County and its vicinity during the past 2 centuries is summarized below. Damage figures are determined in dollar values at the time of the storm. No attempt has been made to adjust these figures to current dollar values.

September 7, 1804

This severe hurricane moved inland on September 7 between the City of Savannah, Georgia, and the City of Charleston and caused significant damage on the coasts of Georgia and South Carolina. This storm is said to have caused more than 500 deaths in South Carolina. The hurricane also caused major damage to the South Carolina economy. Historical notes contain no data on the height of the storm tides or strength of the winds.

August 27, 1813

This storm passed near Charleston causing a large loss of lives and property. This hurricane rates a position close to the top of Charleston's meteorological list for its combination of severe winds, heights of flood tide, and general destruction.

September 27, 1822

A small destructive hurricane passed inland between the City of Georgetown and Charleston on September 27. This hurricane caused unprecedented tides at Georgetown and several hundred deaths in Charleston, the Township of Sullivans Island, Georgetown, and North Island.

August 7, 1854

This major hurricane approached the United States from the south-southeast after moving through the northern Bahamas. The southeasterly winds along the South Carolina coast drove the waters of the Atlantic Ocean into the bays and inlets, over some of the low-lying islands, and into the tidal lowlands that fringe all the rivers and streams (Reference 6). Edisto Island, near Charleston, suffered severly, as did the City of Port Royal and Beaufort County to the south. The storm commenced on Thursday, August 7, and did not end until Saturday night.

August 25, 1855

This hurricane, which originated in the Bahamas, moved inland north of Savannah on a northeasterly course and passed to the west of the City of Wilmington, North Carolina. It is said to have damaged 90 percent of the houses in Charleston and swept some away completely. This extreme hurricane severely damaged all of the South Carolina coast. Damage in Charleston alone was $1.7 million. As a result of this destructive storm, it was proposed that a weather reporting network be set up in the West Indies and Mexico. Twenty-one lives were lost in Charleston as a result of this storm (Reference 7).

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August 27, 1893

This severe hurricane penetrated the Georgia and lower South Carolina coasts on August 27. It is estimated that more than 1,000 people lost their lives on the coastal islands and in the lowlands between the City of Tybee Island, Georgia, and Charleston (Reference 7). The highest tide in this storm was estimated to have ranged from 17.0 to 19.5 feet msl at Savannah Beach, Georgia (Reference 8). At Charleston, the tide was 8.9 feet msl. Extensive property damage was caused along the Georgia and South Carolina coasts.

August 23-30, 1911

The center of this hurricane crossed the coast between Savannah and Charleston on August 28. This storm is considered in the same category as the storm of 1940, described below. At Charleston, the barometer fell to 992 millibars (mb) (29.30 inches). The wind at the weather bureau office reached 81 mph from the southeast (Reference 9). Seventeen lives were lost, and damage totalled about $1 million. The storm passed into the piedmont section of South Carolina and then recurved to the northeast (Reference 10). At Charleston, the tide reached 7.5 feet msl, the third highest of Charleston County records.

August 11, 1940

This hurricane entered the coast from the southeast, between Savannah County, Georgia, and Beaufort County, South Carolina, at about 4 p.m. on August 11. Near Beaufort County, the tide is estimated to have reached 14.2 feet msl. Near the southern tip of Edisto Island, a high-water mark indicated a tide of 13.6 feet msl on the open coast. About 175 cottages were destroyed on Edisto Island. On the Township of Folly Island, the maximum tide determined from a National Ocean Survey benchmark was 8.3 feet msl. The entire beachfront eroded an average of 75 feet. At Charleston, most of the damage was to buildings, wharves, and boats along the waterfront. Large areas of the low waterfront perimeter in the city were inundated and many automobiles were damaged by the storm tide, which reached an elevation of 8.0 feet msl. Estimated damage to the city was $1 million.

Sullivans Island, the City of Isle of Palms, and Pawleys Island suffered minor damage. Overall, this hurricane was responsible for 34 deaths and caused damage estimated at $6.6 million (Reference 11).

October 15, 1954 (Hurricane Hazel)

Hurricane Hazel crossed the coast just north of the City of Myrtle Beach, South Carolina, on October 15. This hurricane was one of the most destructive to strike the Carolinas in terms of property damage. Hurricane winds hit the Atlantic coast between Georgetown, South Carolina, and Cape Lookout, North Carolina. Storm tides devastated the immediate oceanfront along this stretch of coast. High tides of 16.6 feet msl were observed at Holden Beach Bridge and Calabash, North Carolina. The lowest recorded barometric pressure of 938 mb (27.71 inches) was reported at Little River Inlet on the South Carolina-North Carolina border. Folly Island, Sullivans Island, and Isle of Palms suffered light property damage and slight beach

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erosion. The City of Charleston experienced no serious damage. Total property damage was estimated at $34 million in North Carolina and at $27 million in South Carolina.

September 29, 1959 (Hurricane Gracie)

Hurricane Gracie moved inland on September 29. The center passed over the South Carolina coast at St. Helen about 10 miles east of the City of Beaufort. Damage of disaster proportions occurred in the coastal region from Beaufort to Charleston, and considerable additional damage occurred in the area of Walterboro. An enormous number of trees were felled, causing considerable random damage. There was a great deal of crop damage, especially to unpicked cotton (Reference 7). A barometric pressure of 950 mb (28.06 inches) was reported at Beaufort. The total damage inflicted by the storm was estimated at $14 million. High-water marks, which were reported near Edisto Beach, South Carolina, ranged from 7.3 to 11.9 feet msl.

August 25-September 7, 1979 (Hurricane David)

Hurricane David was the most intense storm of the century to affect the islands of the eastern Carribean. However, the storm was not a major hurricane when it struck the United States. David struck just north of Palm Beach, Florida, on September 3 and made a second landfall about 24 hours later near Savannah Beach, Georgia. In the United States, David was responsible for five deaths and about $300 million in damages. The death toll and damage were much greater in Dominica, Cuba, and the Dominican Republic (Reference 12).

2.4 Flood Protection Measures

Due to the parameter of this existing data study, information regarding flood protection measures in the community is obtained only from the source report (Reference 1) and any other readily available sources. None of these sources provided information relating to the flood protection measures in the community.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein

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reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Analyses were carried out to establish the peak elevation-frequency relationships for each flooding source studied in detail.

In areas not affected by the Type 19 reanalysis of Charleston County, the hydrologic analysis was obtained from a previously published Type 15 Flood Insurance Study for the Unincorporated Areas of Charleston County, South Carolina (Reference 2).

Inundation from the Atlantic Ocean caused by passage of storms (storm surge) was determined by the joint probability method (Reference 13). The storm populations were described by probability distributions of 5 parameters that influence surge heights. These were central pressure depression (which measures the intensity of the storm), radius to maximum winds, forward speed of the storm, shoreline crossing point, and crossing angle. These characteristics were described statistically based on an analysis of observed storms in the vicinity of the Town of Hollywood. Primary sources of data for this were "Tropical Cyclone Card Deck 993" (Reference 14), "Tropical Cyclones of the North Atlantic Ocean, 1871-1980" (Reference 15), "Tropical Cyclones of the North Atlantic Ocean" (Reference 16), and "Some Climatological Characteristics of Hurricanes and Tropical Storms, Gulf and East Coasts of the United States (Reference 17)." A summary of the parameters used for the area is presented in Table 1, Parameter Values for Surge Elevations.

For areas subject to flooding directly from the Atlantic Ocean, the FEMA standard storm surge model was used to simulate the coastal surge generated by any chosen storm (that is, any combination of the 5 storm parameters defined previously). By performing such simulations for a large number of storms, each of known total probability, the frequency distribution of surge height can be established as a function of coastal location. These distributions incorporate the large-scale surge behavior, but do not include an analysis of the added effects associated with much finer scale wave phenomena, such as wave height or runup. As the final step in the calculations, the astronomic tide for the region is then statistically combined with the computed storm surge to yield recurrence intervals of total water level (Reference 18).

The storm-surge elevations for the 10-, 50-, 100-, and 500-year floods have been determined for the Town of Hollywood and are shown in Table 2, Summary of Stillwater Elevations. The analyses reported herein reflect the stillwater elevations due to tidal and wind setup effects and include the contributions from wave action effects.

3.2 Hydraulic Analyses

Hydraulic analyses, considering storm characteristics and the shoreline and bathymetric characteristics of the flooding sources studied, were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the shorelines.

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CENTRAL PRESSURE DEPRESSION (MILLIBARS)	83	67	53	42	33	23	9
ASSIGNED PROBABILITIES[1]	0.03	0.08	0.11	0.13	0.16	0.29	0.20
STORM RADIUS TO MAXIMUM WINDS (NAUTICAL MILES)	12			20			28
PROBABILITY[1]	0.24			0.26			0.50
FORWARD SPEED (KNOTS)	7			11			15
PROBABILITIES:[1]	0.45			0.30			0.25
DIRECTION OF STORM PATH[1] (DEGREES FROM TRUE NORTH)			327		301		
PROBABILITY[1]			0.51		0.49		
FREQUENCY OF STORM OCCURRENCE (STORM/NAUTICAL MILE/YEAR)	65[2] 0.00107		20[2] 0.0012		25[3] 0.00124		70[3] 0.00131

[1]AVERAGE OF DIFFERENT STORM TRACK LOCATIONS
[2]NAUTICAL MILES SOUTH OF GEORGIA-SOUTH CAROLINA BOUNDARY
[3]NAUTICAL MILES NORTH OF GEORGIA-SOUTH CAROLINA BOUNDARY

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HOLLYWOOD, SC
(CHARLESTON CO.)

PARAMETER VALUES FOR SURGE ELEVATIONS
(ENTERING HURRICANES)

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CENTRAL PRESSURE DEPRESSION (MILLIBARS)	83	67	53	42	33	23	9
ASSIGNED PROBABILITIES[1]	0.03	0.08	0.11	0.13	0.16	0.29	0.20
STORM RADIUS TO MAXIMUM WINDS (NAUTICAL MILES)	12			20			28
PROBABILITY[1]	0.24			0.26			0.50
FORWARD SPEED (KNOTS)	7			11			15
PROBABILITIES:[1]	0.32			0.30			0.38
DIRECTION OF STORM PATH[1] (DEGREES FROM TRUE NORTH)				35			
PROBABILITY[1]				1.0			
FREQUENCY OF STORM OCCURRENCE (STORM/NAUTICAL MILE/YEAR)	65[2] 0.0039[4] 0.0042[5]		20[2] 0.0045[4] 0.0048[5]		25[3] 0.0051[4] 0.0054[5]		70[3] 0.0058[4] 0.0061[5]

[1]AVERAGE OF DIFFERENT STORM TRACK LOCATIONS
[2]NAUTICAL MILES SOUTH OF GEORGIA-SOUTH CAROLINA BOUNDARY
[3]NAUTICAL MILES NORTH OF GEORGIA-SOUTH CAROLINA BOUNDARY
[4]15 NAUTICAL MILES OFFSHORE
[5]45 NAUTICAL MILES OFFHSORE

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HOLLYWOOD, SC
(CHARLESTON CO.)

PARAMETER VALUES FOR SURGE ELEVATIONS
(ALONGSHORE HURRICANES)

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CENTRAL PRESSURE DEPRESSION (MILLIBARS)	83	67	53	42	33	23	9
ASSIGNED PROBABILITIES[1]	0.03	0.08	0.11	0.13	0.16	0.29	0.20
STORM RADIUS TO MAXIMUM WINDS (NAUTICAL MILES)	12			20			28
PROBABILITY[1]	0.24			0.26			0.50
FORWARD SPEED (KNOTS)	7						13
PROBABILITIES:[1]	0.45						0.55
DIRECTION OF STORM PATH[1] (DEGREES FROM TRUE NORTH)			54		94		
PROBABILITY[1]			0.75		0.25		
FREQUENCY OF STORM OCCURRENCE (STORM/NAUTICAL MILE/YEAR)	65[2] 0.0026		20[2] 0.0013		25[3] 0.00069		70[3] 0.00056

[1]AVERAGE OF DIFFERENT STORM TRACK LOCATIONS
[2]NAUTICAL MILES SOUTH OF GEORGIA-SOUTH CAROLINA BOUNDARY
[3]NAUTICAL MILES NORTH OF GEORGIA-SOUTH CAROLINA BOUNDARY

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HOLLYWOOD, SC
(CHARLESTON CO.)

PARAMETER VALUES FOR SURGE ELEVATIONS
(EXITING HURRICANES)

FLOODING SOURCE AND LOCATION	TRANSECT	STILLWATER ELEVATION (FEET NGVD)			
		10% (10-YEAR)	2% (50-YEAR)	1% (100-YEAR)	0.2% (500-YEAR)
ATLANTIC OCEAN					
Southwest corner of community	N/A	9.8	11.2	11.7	12.9
Area of community southeast of State Route 162	N/A	9.8	10.9	11.5	12.3
Along Wallace River north of U.S. Route 17	1	N/A	N/A	7.0	N/A
Along Log Bridge Creek	N/A	N/A	N/A	8.0	N/A

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HOLLYWOOD, SC

(CHARLESTON CO.)

SUMMARY OF STILLWATER ELEVATIONS

ATLANTIC OCEAN

All dunes and structures were assumed to remain intact for purposes of this analysis.

The FEMA storm surge model was utilized to simulate the hydrodynamic behavior of the surge generated by the various synthetic storms. This model utilizes a grid pattern approximating the geographical features of the study area and the adjoining areas. Surges were computed utilizing grids of 8 nautical miles by 5 nautical miles and 6,000 feet by 6,000 feet, depending on the resolution required.

Underwater depths and land heights for the model grid systems were obtained from National Oceanic and Atmospheric Administration (NOAA) nautical charts, U.S. Geological Survey topographic maps, and aerial photogrammetry (References 19-22).

The methodology for analyzing the effects of wave heights associated with coastal storm surge flooding is described in a report prepared by the National Academy of Sciences (Reference 23). This method is based on the following major concepts. First, depth-limited waves in shallow water reach a maximum breaking height that is equal to 0.78 times the stillwater depth. The wave crest is 70 percent of the total wave height above the stillwater level. The second major concept is that wave height may be diminished by dissipation of energy due to the presence of obstructions, such as sand dunes, dikes and seawalls, buildings, and vegetation. The amount of energy dissipation is a function of the physical characteristics of the obstruction and is determined by procedures prescribed in Reference 23. The third major concept is that wave height can be regenerated in open fetch areas due to the transfer of wind energy to the water. This added energy is related to fetch length and depth.

Wave heights were computed along transects (cross-section lines) that were located along the coastal areas, as illustrated in Figure 2, Transect Location Map, in accordance with the "Users Manual for Wave Height Analysis" (Reference 24). The transects were located with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, they were spaced at large intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects.

Each transect was taken perpendicular to the shoreline and extended inland to a point where wave action ceased. Along each transect, wave heights and elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features. The stillwater elevations for the 100-year flood were used as the starting elevations for these computations. Wave heights were calculated to the nearest 0.1 foot, and wave elevations were determined at whole-foot increments along the transects. The location of the 3 foot breaking wave for determining the terminus of the V zone (area with velocity wave action) was also computed

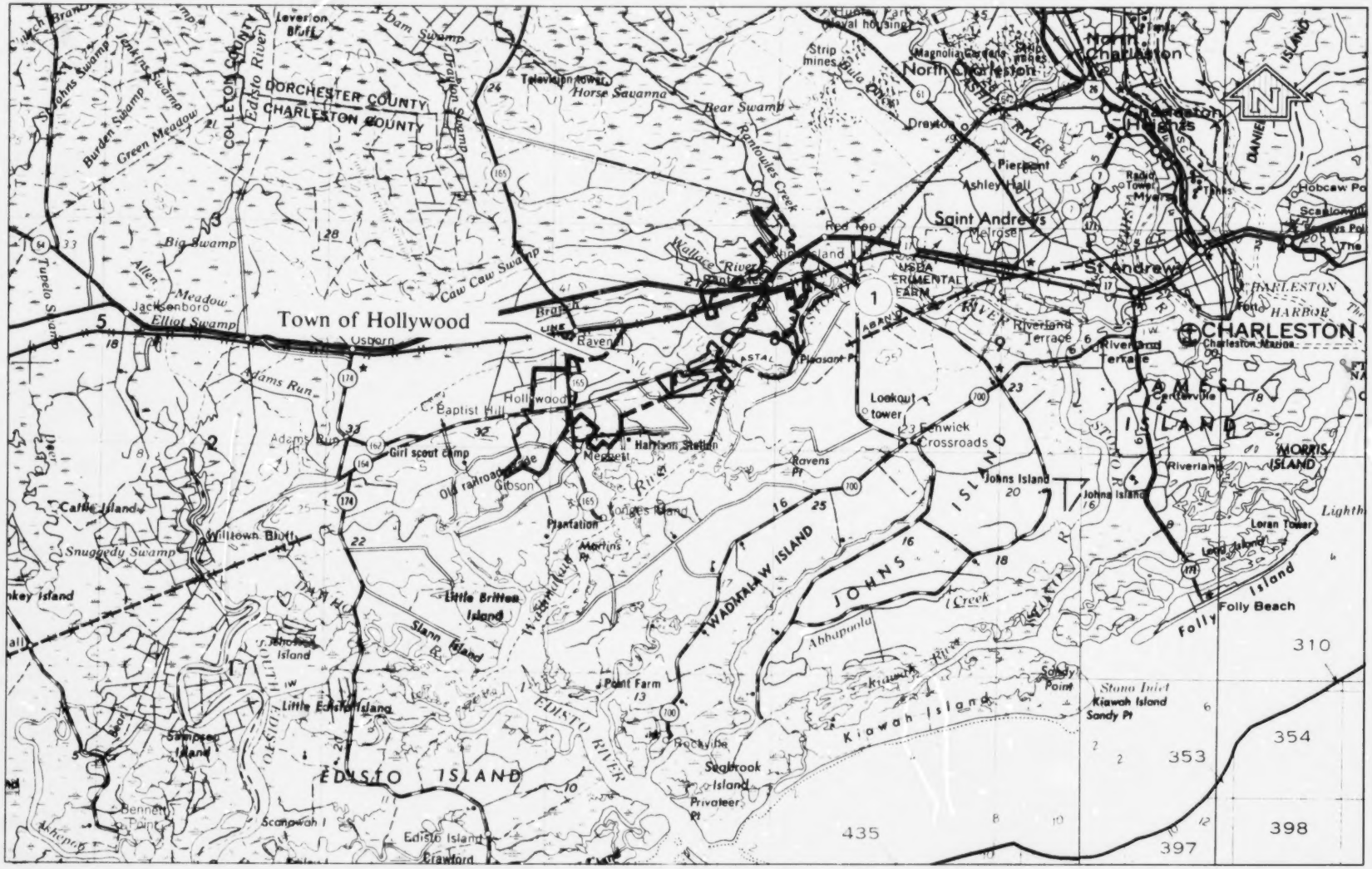

FIGURE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HOLLYWOOD, SC

(CHARLESTON CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

TRANSECT LOCATION MAP

at each transect. Table 3 provides a listing of the transect locations and stillwater starting elevations, as well as initial wave crest elevations.

TABLE 3 - TRANSECT LOCATIONS, STILLWATER STARTING ELEVATIONS, AND INITIAL WAVE CREST ELEVATIONS

Transect	Location	Elevation (Feet) Stillwater	Wave Crest
1	near State Route 17 bridge over Rantowles Creek	7.0	10.0

Figure 3 represents a sample transect that illustrates the relationship between the stillwater elevation, the wave crest elevation, the ground elevation profile, and the location of the A/V zone boundary.

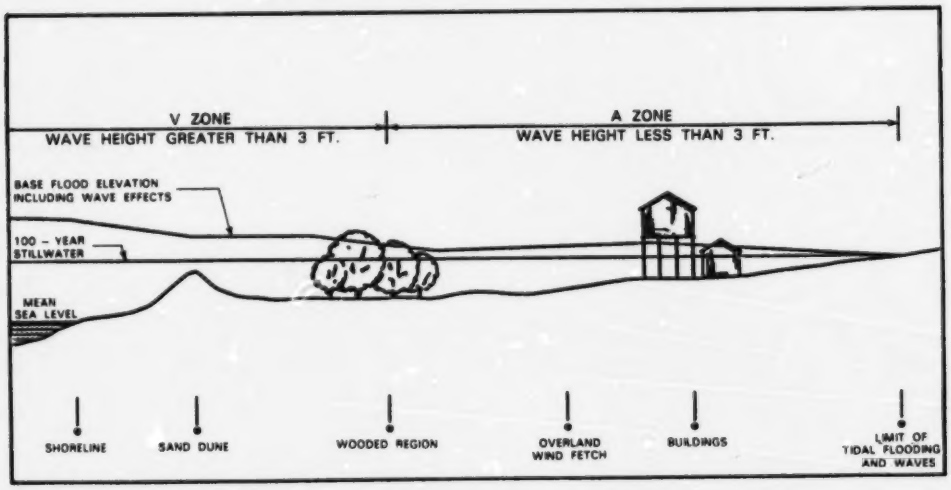

FIGURE 3 - Transect Schematic

After analyzing wave heights along each transect, wave elevations were interpolated between transects. Various source data were used in the interpolation, including topographic maps (Reference 21), aerial photographs (Reference 22), and engineering judgment. Controlling features affecting the elevations were identified and considered in relation to their positions at a particular transect and their variation between transects.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD).

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each flooding source studied in detail, the 100- and 500-year flood boundaries have been delineated using the flood elevations determined at each transect. Between transects, the boundaries were interpolated using topographic maps at a scale of 1:24000 with a contour interval of 5 feet (Reference 21).

Flood plain boundaries are indicated on the Flood Insurance Rate Map. On this map, the 100-year flood plain boundary corresponds to the boundary of the areas of special flood hazards (Zone A, numbered A zones, and numbered V zones) and the 500-year flood plain boundary corresponds to the boundary of areas of moderate flood hazards (Zone B). In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail affecting the Town of Hollywood.

5.1 Reach Determinations

In coastal areas, reaches are limited to the distance for which the 100-year flood elevation does not vary more than 1.0 foot. The locations of these reaches are shown on the Flood Insurance Rate Map.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for areas subject only to storm surge flooding is the difference between the 10- and 100-year stillwater elevations rounded to the nearest 0.5 foot, multiplied by 10, and shown as a 3-digit code. For areas with wave heights less than 3 feet, the FHF is the weighted average difference between the 100-year wave crest elevation and the 10-year stillwater elevation. For areas with wave heights greater than 3 feet, the FHF is determined using the difference between the 10- and 100-year stillwater elevations multiplied by 1.55, then rounded to the nearest 0.5 foot, multiplied by 10, and shown as a 3-digit code.

For example, if the difference between elevations is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0

feet, the FHF is 050. When the difference is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations are shown or FHFs determined.
Zones A3, A4, A13, A15:	Special Flood Hazard Areas inundated by the 100-year flood, with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- and 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and, areas subject to 100-year flooding from sources with drainage areas of less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Table 4, Coastal Flood Insurance Zone Data.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Town of Hollywood is, for insurance purposes, the principal product of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. For each flooding source, the expected water-surface elevations of the base (100-year) flood are shown as a weighted average within zones. Each whole-foot elevation is delineated except where cartographic considerations require the combination of two or more elevation zones. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

FLOODING SOURCE	TRANSECT	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND 10% (10-YEAR)	FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3,4] (FEET NGVD)
ATLANTIC OCEAN	N/A	0015	−1.9	020	A4	12
	N/A	0005,0010,0015	−1.7	015	A3	12
	1	0005,0010	−7.5[5,6]	075	A15	7−10
	N/A	0005,0010	−6.5[6]	065	A13	8

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE IN FEET
[3]ROUNDED TO NEAREST FOOT
[4]DUE TO MAP SCALE LIMITATIONS, BASE FLOOD ELEVATIONS SHOWN ON MAP MAY REPRESENT AVERAGE ELEVATIONS FOR THE ZONES DEPICTED
[5]INCLUDES EFFECTS OF WAVE ACTION
[6]INFORMATION TAKEN FROM TYPE 15 FLOOD INSURANCE STUDY FOR UNINCORPORATED AREAS OF CHARLESTON COUNTY, SOUTH CAROLINA

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF HOLLYWOOD, SC

(CHARLESTON CO.)

COASTAL FLOOD INSURANCE ZONE DATA

ATLANTIC OCEAN

6.0 OTHER STUDIES

Previous studies have been conducted by several agencies for the entire coast of South Carolina. In 1973, the South Carolina Disaster Preparedness Agency published a study of meteorological characteristics of tropical cyclones along the South Carolina coast (Reference 7).

In June 1975, NOAA developed predictions of hurricane tidal surges along the South Carolina coast (Reference 5). The NOAA study used a different computer program than the TTSURGE program used in this study. The TTSURGE program is the methodology currently used by FEMA (Reference 18). The two sets of predicted surges in the range of 50- to 100-year return period agreed. For smaller return periods (e.g., 10-year), this study found higher surges. This may be explained by the fact that NOAA neglected exiting hurricanes that typically produce small (but significant surges. For higher return periods (e.g., 500-year), this study predicted smaller surges than NOAA. It appears that this difference is partially due to an attempt by NOAA to calibrate its predictions against high-water marks data that most likely are too high due to the effects of wave setup and runup.

The effects of the use of high-water marks, biased by wave action, are presented in a study prepared by Bernard Le Mehaute (Reference 25). In this study, a critical analysis of storm surge and wave crest elevation computed along the South Carolina shoreline is presented.

In 1959, the U.S. Weather Bureau and the U.S. Army Corps of Engineers published a study of meteorological characteristics of hurricanes along the Atlantic and Gulf coasts of the United States (Reference 26).

Flood Insurance Studies are currently being prepared for Charleston County and the Town of Meggett, Charleston County, South Carolina (References 1 and 27). The results of these studies are in agreement with this report.

A Flood Insurance Study has been prepared for the Town of Ravenel, Charleston County, South Carolina (Reference 28). The results of that study agree with the results of this Flood Insurance Study for the Town of Hollywood.

Due to its more detailed analysis, this Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for the Town of Hollywood (Reference 29).

7.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 1371 Peachtree Street, NE., Suite 736, Atlanta, Georgia 30309.

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